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OCTOBER 1965

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F E D E R A L A V I A T I O N A G E N C Y

VOL. 4, NO. 6 OCTOBER 1965

COVER

Certificated by the FAA last month, the 285 m.p.h. Turbo Commander is designed to achieve spectacular climb rates up to 2,000 feet a minute.

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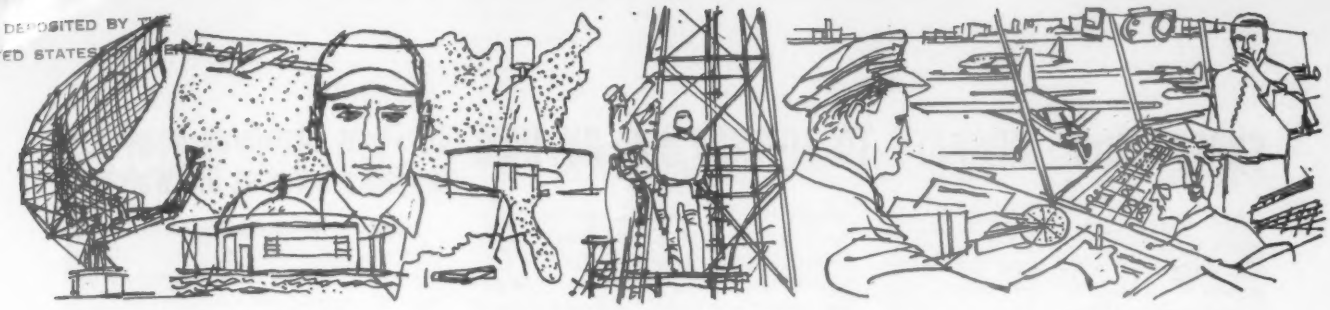


AGENCY ANNOUNCES CHANGES IN PILOT RATING REQUIREMENTS

New pilot rating regulations aimed at matching pilot skills to the complexities of modern high performance aircraft were announced last month by the Federal Aviation Agency.

Primary purpose of the new rules is to insure that a certificated pilot is fully qualified to serve as pilot-in-command of an aircraft which handles differently from aircraft in which he has acquired his flying experience.

Under the new rules, which become effective Dec. 16, 1965, pilots will be required to hold a type rating to act as pilot-in-command of any large aircraft (12,500 pounds or more) regardless of type of operation. Current rules require the pilot to be type rated for a large aircraft only when passengers are carried or when the flight is for remuneration. He is not required now to hold a type rating when persons other than passengers are carried, such as crewmembers, or when the plane is flown solo.

After March 31, 1966, pilots-in-command of small turbojet airplanes also will be required to hold a type rating for any type of operation in such planes. There are no specific current rules covering pilot certification to fly small jets, such aircraft having been introduced in service only recently. The advance date is intended to give pilots involved sufficient time to prepare for necessary flight tests.

A similar change is the requirement for a category and class rating by a pilot-in-command of a small piston aircraft when other persons are aboard or when operating for compensation. Current rules require these ratings specifically when passengers are carried, not any other persons, such as crewmembers.

Also, before flying a small piston aircraft solo, the new rules call for an unrated pilot to have prior flying experience in that category and class aircraft or perform a minimum of three take-offs and landings while accompanied by a rated pilot. The unrated pilot will have to be solo operator of the controls on such familiarization flights.

Under current rules, any certificated pilot who does not hold a rating for a small aircraft could fly it solo without having to meet any prior experience requirements for that category and class.

There are four broad categories of aircraft—airplane, rotorcraft, glider, and lighter-than-air. Except for gliders, each category is subdivided by class. In the airplane category, the classes are single-engine land, multi-engine land, single engine sea, and multi-engine sea. The rotorcraft category has only two classes—helicopters and gyroplanes. The lighter-than-air category also has two classes—airships and free balloons. Type of aircraft refers to specific make and basic model, such as the Douglas DC-3, Convair 440, etc.

Pilot certificates indicate the category, class, and type rating, as the case may be, which the pilot holds. (See the sample pilot certificate.)

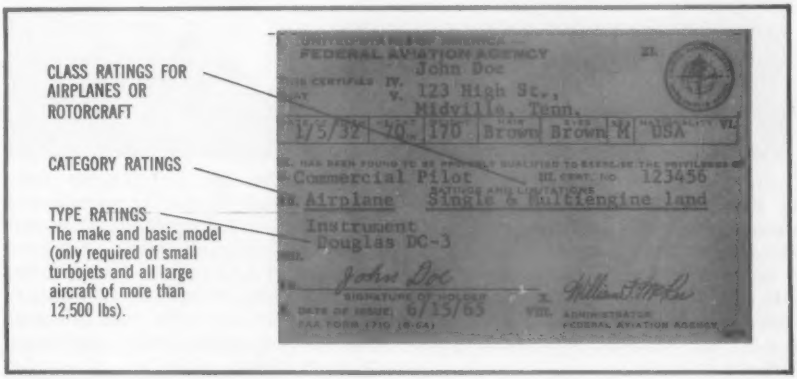
For example, under the new rules, if a pilot were to carry persons in a small single-engine landplane he would be required to hold a category rating for airplanes and a class rating for single-engine land. Under the new solo requirements for small aircraft, a pilot rated in airplanes only and wishing to solo in a helicopter, for example, would have to acquire experience in a helicopter aircraft before making a solo flight, since it is in a different category than airplanes.

The new type rating requirement for all large aircraft operations will give crewmembers in particular the same assurance of flying with a qualified pilot-in-command as now afforded regular passengers. Flights carrying crewmembers are generally those conducted for training, to check out equipment, or for hauling cargo which may require cargo attendants in addition to crewmembers.

While solo flight in large aircraft not involving compensation is not common, the new type rating requirement will provide persons and property on the ground a measure of protection against a potential situation involving the operation of a large aircraft by an unrated pilot. This could be of particular importance in operations over congested areas.

The notice of proposed rule-making which preceded the new rules contained a proposal for pilots to have a flight check by a flight instructor or an FAA inspector in each type of complex aircraft flown, and have the check recorded by the examiner in the pilot's logbook. This proposal was not written into the final regulations and is receiving further study by the FAA.

Several additional changes are reflected in the new rules, which are based on Notice No. 64-42, issued Sept. 16, 1964, and on comments received, including a provision for FAA Flight Standards District Offices to authorize deviation from some of the new rules when compliance would be impractical.



EXPECT CIVIL AIRCRAFT TO TOP 107,000 BY 1969

The number of active civil aircraft which topped 90,000 in 1964 will probably continue its nearly 4 per cent yearly growth to 107,100 by 1969, according to a new statistical study, "Census of U. S. Civil Aircraft."

Of the 90,935 active civil aircraft on FAA rolls at the close of 1964, 88,742 were general aviation aircraft. Of the 2,193 belonging to the airlines, only 2,081 were actually engaged in airline operations.

By 1969 FAA forecasts the active general aviation fleet to reach an all time high of 105,000 and the airline fleet to decrease to 2,090.

Composition of the general aviation fleet is changing with an increasing preference for multi-engine aircraft and single-engine aircraft of four places and more.

During the five years from 1959 to 1964, multi-engine general aviation aircraft increased from 6,034 to 10,644. Single engine aircraft, four places and more, increased from 27,301 to 45,777, while those with three places and less decreased from 34,543 to 30,367. Rotary wing aircraft jumped from 525 to 1,306 in the same period, and gliders, balloons, and dirigibles used by general aviation increased from 324 to 648.

Airline aircraft increased only 14 in 1964 over 1963. The 2,081 aircraft actually engaged in airline operations was the same as in 1958, but the load capacity almost doubled, rising from 14,775 tons in 1958 to 27,053 tons in 1964. The airlines added 124 turbine powered aircraft to the air carrier fleet in 1964 for a total of 812 turbines in operation as against 688 in 1963.

The 10 states leading in number of active aircraft for 1964 were identical with the top 10 a year ago. They are, in rank order: California, Texas, Illinois, New York, Ohio, Michigan, Florida, Pennsylvania, Kansas, and Indiana.

Four out of every five aircraft registered with the FAA were manufactured by the top 10 manufacturers listed in the new FAA publication. Aircraft of these manufacturers accounted for 110,270 out of 137,189 active and inactive registered civil aircraft.

Inactive aircraft are those which have not been FAA inspected within the last 12 months.

The new FAA publication, "Census of the U. S. Civil Aircraft," is on sale for $1.00 from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

The new study combines two previous FAA reports, "Statistical Study of U. S. Civil Aircraft" and "U. S. Active Civil Aircraft by State and County."

Helio Stallion STOL Aircraft Certificated by FAA

The Helio *Stallion*, recently certificated by the FAA, is a 10-place, turboprop, single-engine, STOL aircraft. Almost 40 feet long, it has a wing span of 41 feet, 9 inches, and was specifically designed for safe operation from unprepared fields, combining extremely low speed (31 m.p.h.) and efficient high speed (over 200 m.p.h.).

The *Stallion* has a 2,615-mile ferry range. It meets the NATO International STOL Standard for single-engine aircraft which is defined as the ability to operate in and out of a single strip with 660 feet between 50-foot obstacles while maintaining good maneuverability with full stall-proof safety in event of heavy turbulence and sharp gusts.

10 Flight Standards Inspectors In Alaska Serve as Girl Watchers

Miss Karis Ricketts is right on course with the FAA policy which encourages all Flight Standards employees—including the young ladies—to fly.

"How would you like to have 10 FAA Flight Standards inspectors watching you every time you bounce in a landing?" asks Miss Karis Ricketts, administrative clerk in the FAA's Flight Standards District Office (FSDO) at Merrill Field, Anchorage, Alaska.

This has been her problem ever since she started taking her first flying lessons a year ago.

"Even after I soloed in July, they still keep watching me every time I fly the Civilair Club's plane," sighs Karis.

Perhaps it was working in the "fish bowl" environment at the FSDO that got Karis started on flying shortly after her assignment there in the summer of '64. The east-west runway at Merrill Field is only "ground loop" distance away from her office.

"I never had any inclination to fly before," says Karis, "but being around so many airplanes and flyers, I couldn't resist the urge to become a pilot myself."

Karis doesn't really complain too much about all the flying tips, safety pointers, and attention directed her way by her 10 self-appointed ground school instructors. "They tease me a lot, but I know they are trying to help me."

As far as her flying future is concerned, the ceiling and visibility are unlimited for Karis Ricketts.

INDUSTRY ROLE EXPANDS IN CERTIFICATION OF AERONAUTICAL PRODUCTS

An expanded role for industry in the certification of aeronautical products has been approved by the FAA in two separate but related rule making actions. Both went into effect Oct. 8.

The first permits FAA to delegate authority to qualified manufacturers for certification of helicopters and smaller turbine engines, as well as for parts for aeronautical products.

This authorization will allow manufacturers to conduct certification programs for their products with a minimum of FAA participation.

This rule also places the responsibility for certification programs conducted under delegation procedures directly upon the manufacturers instead of upon the Designated Manufacturer's Certification Representative (DMCR).

Under this rule the position of DMCR will be eliminated.

At present, delegation procedures are permitted in the certification of airplanes and gliders weighing less than 12,500 pounds, smaller piston engines, and propellers manufactured for use on these engines.

These operations have been highly successful and have influenced the Agency's decision to extend similar privileges to manufacturers of rotorcraft, small turbine engines, and parts for aircraft, engines, and propellers.

The second of the new rules provides for the establishment of Designated Alteration Stations by qualified manufacturers, air carriers, commercial operators of large aircraft, and domestic repair stations. These facilities will have delegated authority (1) to issue supplemental type certificates for type certificated products; (2) to issue experimental airworthiness certificates for aircraft they have altered; and (3) to amend standard airworthiness certificates for such aircraft.

Present regulations do not provide for a delegation of authority where approval of major alteration of products is involved. A repair station, for example, must apply to FAA for issuance of a supplemental type certificate for each major change in an aircraft type design not requiring a new type certificate.

These procedures have resulted in delays in completing the work and have caused additional expenses for the parties involved.

The two new rules are based on Notices of Proposed Rule Making circulated for industry comment on April 25, 1963 (Notice 63–17) and Jan. 29, 1965 (Notice 65–2).

$84.5 Million in FAAP Funds Allocated for 445 Airports in Fiscal 1966

The allocation of $84.5 million in Federal matching funds for the construction and improvement of 445 civil airports under the Federal-aid Airport Program (FAAP) for fiscal year 1966 was announced last month by the FAA.

The allocations are based on $75 million appropriated by the Congress for the fiscal year which started July 1, plus funds carried over from previous years. The program was formulated after careful examination of 603 requests for aid totaling $161.7 million.

The 1966 program provides for the improvement of 371 existing airports in the amount of $74.7 million and the construction of 74 new airports in the amount of $9.8 million.

Federal funds contained in the program will match those provided by local project sponsors, generally on a 50-50 basis. In some cases states also assist local communities in providing additional funds.

Major emphasis is placed on development at airports used by the airlines, airports used by general aviation which relieve congestion at busy metropolitan airports, and airports used by commercial air taxis. It allocates $79 million for these purposes.

In addition, $5.5 million is allocated to 96 other airports which are used by general aviation.

Significant accomplishments resulting from the program include:

- Runway extensions at 70 locations to accommodate the operation of larger aircraft, including 18 airports used by local service airlines.
- New runways at 116 airports to increase safety and operational capability.
- Installation of low and medium intensity runway lights at 66 unlighted or new airports to improve safety and reliability for air travel.
- Construction or improvement of airports at 51 locations intended to divert general aviation traffic from congested air carrier airports.
- Provide additional facilities at 117 locations having published point-to-point air taxi service and rates.
- Increased safety by the acquisition of land for clear zones at the ends of runways at 194 locations.
- Installation of in-runway lighting at six airports to enable operations under lower ceiling and visibility conditions.
- Installation of high intensity runway edge lights at 11 airports to increase safety under lower weather minimums.
- Increase safety and operational capability at 10 small airports through installation of economy visual approach lighting aids.

'RHINOCEROS' PROVES NIMBLE AND MANEUVERABLE OVER ALASKAN TERRAIN

Aviation mechanic Jerry Lawhorn of Anchorage, Alaska, has been building his airplane and improving it for more than five years. He calls it "a crude looking old rhinoceros."

The "rhinoceros" is a lot more nimble and maneuverable than its namesake. Built strictly for utility, it's as much at home on unprepared clearings as it is on shallow lakes.

Super-sized low pressure tires enable the plane to land on the rocky edges of river banks, and high elevators clear stumps and boulders on take-offs and landings. Augmentation tubes, to which the exhausts are manifolded, poke out of the bottom of the engine. These give added thrust and greatly improve engine cooling during steep "climb outs" with maximum power settings in mountainous terrain. "Flaperons"—combination flap and aileron surfaces—extending from each wing improve climb and descent performance.

FAA inspector Harry W. Schuermeyer, left, from the Anchorage flight standards district office worked closely with Lawhorn throughout the project. Inspectors call it one of the safest appearing airplanes they have ever seen.

Airborne Pictorial Display for Use with FAA Ground Facilities

An airborne pictorial display and course line computer (PD/CLC) has been developed for use in conjunction with FAA's VOR/DME/TACAN ground facilities.

When accuracy standards and operating procedures for IFR use of this new equipment are developed by the FAA, pilots will be able to fly direct IFR routes independent of established airways, while their airplanes' ground track will be shown on a special cockpit map display.

In operation, the computer "moves" an existing ground station to any selected point within the station's transmission range through airborne computation and produces a "phantom station." The computer furnishes electrical signals to aircraft instruments which in turn provide the pilot with continuous course guidance and distance information to or from any selected destination.

The pictorial display in the cockpit continuously shows the airplane's ground track on a special airways chart. The display, like the computer, operates in conjunction with the airplane's VORTAC receiver. It uses bearing and distance information provided by the ground station to position a moving marker over a special navigation chart. The marker continuously shows the pilot his airplane's geographical location with reference to the ground and moves across the chart in synchronization with the airplane's ground track. A pilot can watch the marker and monitor his airplane's progress, or navigate by keeping the marker on any preplanned route.

Proposal To Govern Airport Control Operations

A proposed revision of regulations governing aircraft operations within an airport control zone under various weather conditions has been issued by the Federal Aviation Agency.

The proposal specifies the visibility minimums which must prevail at each airport in a control zone in order for VFR (visual flight rules) or Special VFR operations to be conducted. At present, the reported ground visibility at the primary airport (the airport on which the designation of the control zone is based) governs operations at all airports in the zone. This can result in anomalous situations since weather conditions at the secondary airports may vary from those at the primary airport.

The proposal states that no pilot may take off, land, or enter the traffic pattern of any airport in a control zone under basic VFR unless the ground visibility at the primary airport, as reported by a Weather Bureau or other accredited observer, is three miles or more. When this condition is met, the proposal further provides that the reported ground visibility at the secondary airport must also be at least three miles in order for operations to be conducted there. In cases where a Weather Bureau or other accredited observer is not located at a secondary airport, the "flight" visibility (a judgment of horizontal visibility derived from a cockpit observation) would be the governing factor and must be at least three miles.

The present rule states that no pilot may take off or land in a control zone under regular VFR unless ground visibility is at least three miles. Although the point of weather observation is not specified in the rule, FAA has held that the weather at the primary airport governs operations throughout the zone.

The proposed rule also would permit Special VFR clearances at secondary airports in a control zone when reported ground visibility at these fields is at least one mile, or, in the absence of reported ground visibility, when flight visibility is one mile or more. Under the current rule, Special VFR operations are not permitted in a control zone when ground visibility at the primary airport is less than one mile.

The public is invited to submit comments on the proposed rule (Notice 65–20, Regulatory Docket No. 6893) to FAA Rules Docket, 800 Independence Avenue, S.W., Washington, D. C. 20553. Oct. 21 is the deadline for comment.

MORE ALASKAN RADIO OUTLETS

The FAA has announced plans to modernize its flight service system over a wide area of Alaska by increasing the number of radio outlets from 40 to 106. The new outlets will be installed in remote areas of Alaska where such communications have been limited or unavailable.

Captain Kimes Flies On and On

If Capt. Charles H. Kimes, 44, goes on flying Pan American jets for the next 15 years, as he expects to, it is highly unlikely that he will ever look out of his cockpit window again and be greeted by the sight that met his eyes on the afternoon of June 28, 1965. That was the memorable day his right outboard engine exploded and carried away 25 feet of wing. That was also the day when Captain Kimes and his crew of nine provided a happy ending for what could possibly have been the worst air tragedy in history by calmly and skillfully setting the aircraft down without injury to anyone on board.

Since that day Captain Kimes has continued to fly jets across the Pacific and around the world. It will take more than a ruptured wing to dampen his enthusiasm for aviation, which has been high ever since he was 15 years old. A co-pilot for Pan Am at the age of 21, he has been flying all his adult life and has been a captain for 22 years. He has flown the air routes to every continent, with the exception of Africa, and is as much at home in Hong Kong as he is in Honolulu or Bora Bora.

With 18,000 flying hours and about five million air miles behind him, Captain Kimes is still at midpoint in a career which began with the Civil Pilot Training Program in his home state of Oklahoma in 1940. His flying career has given him a birdman's eye view of most of the major capitals of the world, and the opportunity to explore dozens of out-of-the-way corners of the globe as well as a chance to satisfy his curiosity about storied works of art and nature.

Captain Kimes' first 25 years as a pilot were largely without incident because he is the kind of flyer who pays strict attention to details and who automatically does the right thing at the right time in the cockpit.

His rich experience and disciplined character as a pilot brought him a citation for merit from the Federal Aviation Agency, as well as the gratitude of his passengers and fellow crewmen and the admiration of the world following that nearly ill-fated day some four months ago.

In addition to being a pilot, Charles Kimes is also a skier, a skin-diver, and a golfing enthusiast. He is married and the father of a 16-year-old son, Charles Arthur Kimes. As a result of his father's heroics in the cockpit, young Charles is the recipient of a $4,000 scholarship award from an insurance company which will assist him in his ambition to become a physician. If he inherits the same sense of dedication to his work that distinguishes his father, he will make as great a contribution to the profession of medicine as Captain Kimes has made to the world of aviation.

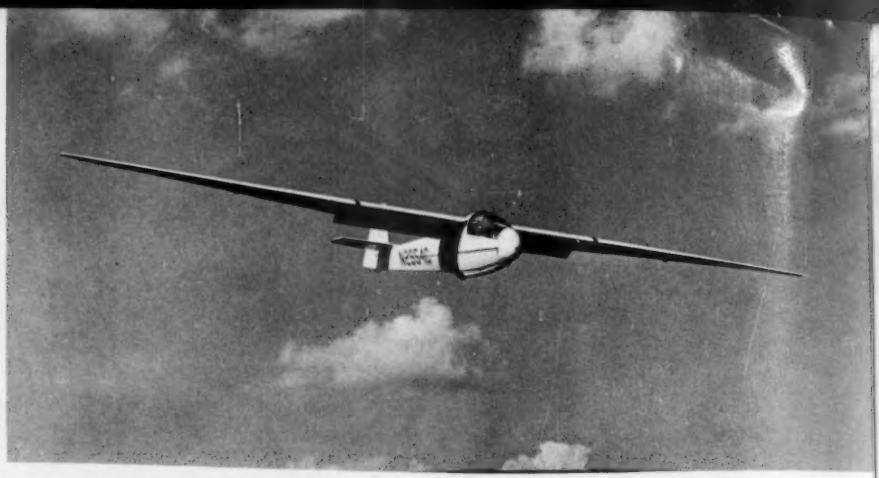
On the day of his heroic action, Kimes, flying a Pan American jet similar to that below, calmed his passengers and made them laugh by announcing, "Well, ladies and gentlemen, we are having some minor trouble . . . or perhaps it isn't so minor."

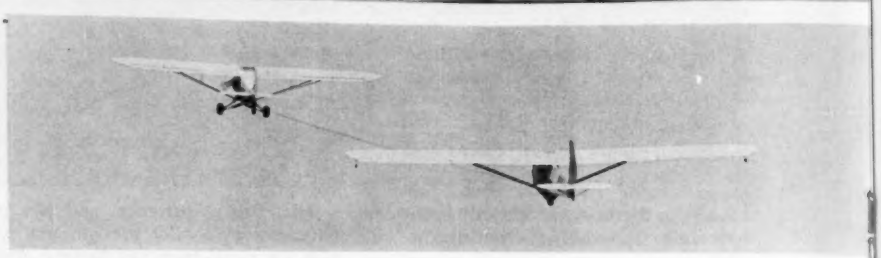
SALE PUBLICATIONS AVAILABLE FROM GPO; FREE PUBLICATIONS FROM FAA

Several new FAA publications are now available. Those marked "free" are available from the FAA, Distribution Section, HQ-438, Washington, D. C. 20553. "For Sale" items are available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

The publications include:

- *General Aviation Inspection Aids Summary;* AC 20-7B, August 1965; GPO, $1.50 domestic for the *Summary* and 11 monthly supplements; $2.00 foreign. While this publication contains brief and advisory information for the use of mechanics, operators of repair stations, and others engaged in the inspection and maintenance of general aircraft, this compilation of manufacturers' recommendations for improvements in their products is of value and interest to many others, including aircraft owners and pilots.
- *Airline Transport Pilot (Airplane) Examination Guide 1965;* AC 61-18, GPO, 35 cents.
- *FAA Publications,* July 1965; FAA, free.
- *Status of the Federal Aviation Regulations;* June 1, 1965; FAA, free.
- *Advisory Circular Checklist;* AC 00-2C, May 1, 1965; FAA, free.
- *FAA Air Traffic Activity, Fiscal Year 1965,* GPO, $1.25.
- *Summary of Airworthiness Directives for Small Aircraft, Jan. 1, 1965,* GPO, subscription $3.00.
- *Summary of Airworthiness Directives for Large Aircraft, Jan. 1, 1965,* GPO, subscription $3.50.
- *U. S. Civil Aircraft Register, July 1, 1965,* AC 20-6D, GPO, $6.25.
- *Census of the U. S. Civil Aircraft as of Dec. 31, 1964,* GPO, $1.00. This replaces *Statistical Study of U. S Civil Aircraft* and *U. S. Civil Aircraft by State and County.*





A Briegleb BG-12A high-performance sailplane makes its final approach. Bottom photo, right, sailplane, with towline attached, is taken to altitude by towplane for release and maneuvering by the pilot in updrafts.

Air-Minded TEEN-AGERS Are Tomorrow's PILOTS

The next generation of professional pilots may very well come from the group of 92 air-minded youngsters who gathered at Chemung County Airport, Elmira, N. Y., this past summer.

Through the combined efforts of the Civil Air Patrol, the Air Force, and the FAA, 10 of the teen-agers became fixed-wing pilots, another 16 were graduated as glider pilots and the feel of flying was introduced to the remainder of the group.

All of this took place after the CAP cadets, ranging in age from 17 to 19 and representing each of the 50 states and Puerto Rico, were brought to Elmira by the Air Force for the first nationwide CAP flying encampment.

Both the FAA's tower and flight service station at Elmira reported their highest monthly activity record during the encampment. The FSS recorded 7,121 flight services. The tower had 18,359 operations with some 10,000 of an 11,305 increase over the same time period last year generated by the CAP encampment.

"But it was all worth it," said one of the controllers. "Some day, one of those kids will be calling Elmira from an airliner, asking for a clearance to land."

The encampment consisted of three separate courses—the Private Pilot Course, the Private Glider Pilot Course, and the Sailplane Orientation Course.

Selection of cadets was made by each of the 52 wings in the eight CAP regions and was based on each cadet having a certificate of proficiency, one summer of CAP camp life, the first phase of the academic program, a third class medical, and a Class II radio license. All had FAA student permits to fly.

The job of checking cadets by monitoring the progress of flying and ground school activities, and by administering written examinations so cadets could get their private pilot certificates, fell to the FAA General Aviation District Office in Rochester.

In the sailplane orientation and private glider pilot courses, the tow planes never shut off their engines during flying hours. One cadet would sit in his sailplane while another would hook on the 200-foot towline and lift the wing upright in preparation for take-off. The towplane pilot would look in his rearview mirror, waggle the plane's rudder, and wait for the return signal from the sailplane. Both would start their take-off run.

As fast as one soaring plane could be towed aloft, taken to altitude, and released, the towplane would return to the field and pick up another cadet who was ready to sail. It was a continuous operation for cadets, instructors, and towplane pilots who were in frequent communication with the FAA controllers.

The sailing portion of the encampment was at the Schweizer Aircraft Corp.

While the cadets on the southside of Chemung Airport were going through the glider orientation course and private glider pilot course, on the northside of the field the powered flight students were meeting one of the most demanding schedules ever levied on a cadet.

Taught by rated FAA instructors from the Elmira Aeronautical Corp., the powered flight student pilots were required to obtain 40 hours of flight time during the four weeks. During the first five days they were logging approximately two hours a day.

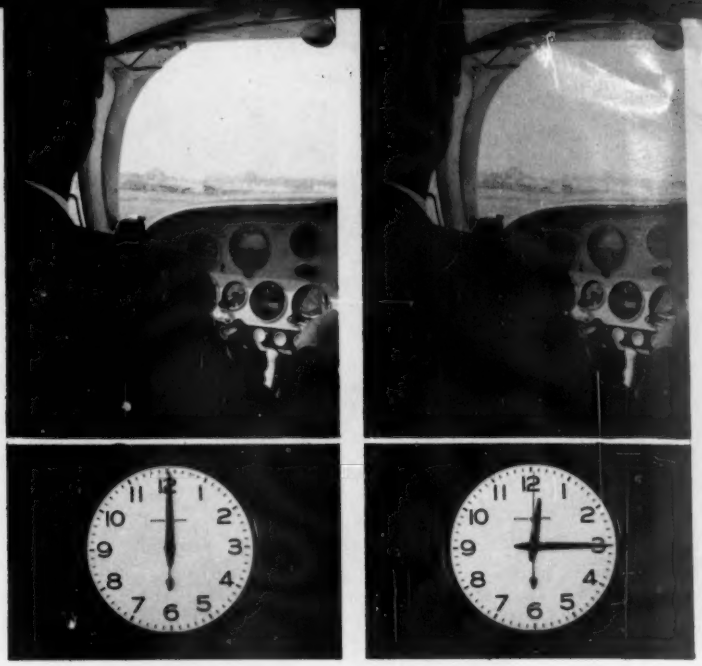
At the end of the encampment each cadet went home a safer and more skillful pilot. The CAP, the Air Force, and the FAA had done their job of nurturing the seed of aviation which the cadets themselves had planted.

CAP cadet, in left photo, checks chart with one of the FAA operations inspectors before take-off. Right, two cadets discuss different maneuvers which were required during the course while another cadet taxis out for a performance checkout with an FAA inspector. Below, one cadet hooks the towline from the towplane to the glider while other cadet, with instructor sitting in rear seat, makes preparations to take off on one of his practice flights.

Left, FAA flight service specialist assists CAP cadets in filling out a flight plan before they take their first solo flight. Below, this scene is not the regular Monday morning wash hanging out to dry but, instead, it shows the traditional snipped shirttails of those cadets who have made their first solo flight. Right, FAA air traffic controller at Elmira, N.Y., explains to cadets what goes on in a typical control tower and shows how flight strips are used.

SAFETY FIRST

DON'T LET CARBON MONOXIDE BLACK YOU OUT



The time intervals are only suggestive, of course. The length of time for carbon monoxide

Most schoolboys can tell you that carbon monoxide (CO) is the product of incomplete combustion and is found in varying degrees in all smoke and fumes from burning carbonaceous substances. They will add that it is a colorless, odorless, tasteless, and highly poisonous gas. What they may not know is that this gas has long been suspected as the cause of certain aircraft accidents.

Such accidents can occur if pilots do not heed the tell-tale signs of deadly carbon monoxide fumes described in the adjoining story which is republished with permission of United Press International.

The dangers of carbon monoxide are always prevalent, but especially so in the fall and early winter when cold weather causes pilots to close their windows and vents, and turn on their heaters. If there is a leak into the cabin through the various openings in the firewall, or the fairings in the area of the exhaust system, the colorless, odorless, tasteless gas begins to seep through.

It doesn't take much carbon monoxide to affect a pilot's judgment or flying ability. A CO concentration of 0.06 per cent can cause unconsciousness within two hours. And, depending upon the physical condition of the pilot, 0.1 per cent can bring death in as short a period as one hour.

Susceptibility to carbon monoxide poisoning increases with altitude inasmuch as air pressure decreases as altitude increases and the body has difficulty getting enough oxygen. Add carbon monoxide, which further deprives the body of oxygen, and the situation can quickly become critical. If a pilot smokes in the presence of carbon monoxide, inhaling can introduce CO into the body in substantial and significant quantities.

When inhaled, carbon monoxide is absorbed by that part of the blood—hemoglobin—which normally carries oxygen. Hemoglobin has an affinity for carbon monoxide about 300 times that of oxygen. Consequently, the absorption of the poisonous gas is quite rapid.

As the hemoglobin becomes saturated with carbon monoxide, oxygen in the blood stream is reduced proportionately. If the air contains sufficient carbon monoxide, oxygen starvation and death can result.

But long before this happens, certain physical disturbances will take place to let you know that CO is on the loose.

The early symptoms carried in the *FAA Aviation News* article described by UPI include sluggishness, a feeling that you are too warm, and an awareness of exhaust odors.

The best protection against carbon monoxide poisoning is to be alert to its symptoms. If you begin to feel *any* of the symptoms, you should immediately assume carbon monoxide is present and take the following precautions:

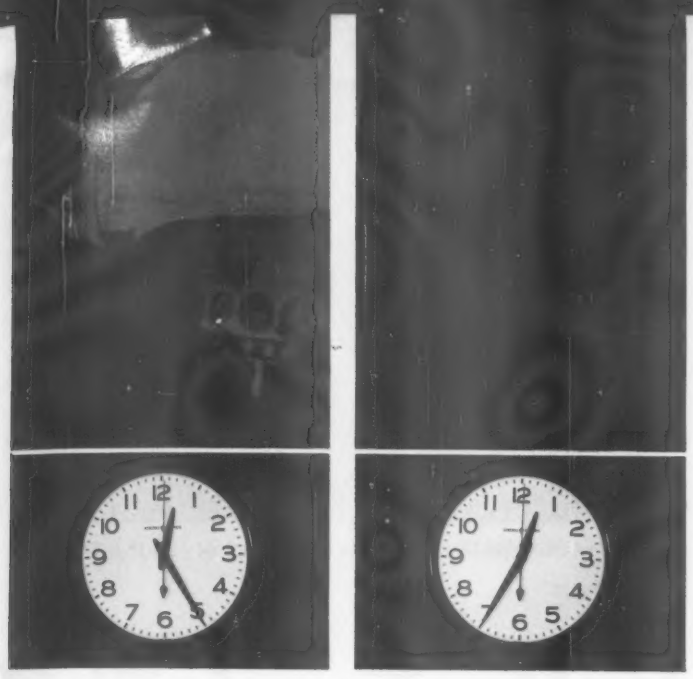
- Shut off the cabin air heater and any other opening that might connect the engine compartment air to the cabin.
- Open a window and any other fresh air source immediately.
- Avoid smoking.
- Breathe 100 per cent oxygen if it is available.
- Land at the first practicable opportunity and be sure that all effects of CO are gone before you take off again.

It is a good practice to supplement cabin heating system inspections with periodic operational carbon monoxide detection tests. These tests are reliable, readily available, and may be performed quickly without any disassembly operations. They may be conducted during flight to determine the extent of CO contamination. The tests should be conducted both with the cabin heat "ON" and cabin heat "OFF."

Apparatus for a color test was developed by the National Bureau of Standards as one early method of detecting the presence of carbon monoxide. While not available at NBS, various instruments that measure or detect carbon monoxide are available through industry.

You can also make sure that your aircraft is not a deathtrap by inspecting the exhaust manifold and heater assembly at regular intervals, as well as whenever CO contamination is suspected. Include this check in your periodic inspection. Cracks and holes may occur in a relatively short time and supplemental inspections are recommended. Many aircraft manufacturers suggest that exhaust and heater systems be inspected as often as every 25 hours of flight time.

Carbon monoxide leaks into the cabin have been traced to worn or defective exhaust stack slip joints, exhaust system



to take effect is dependent upon the amount seeping into the cockpit, and on other factors.

cracks or holes, openings in the engine firewall, "blowby" at the engine breather, defective gaskets in the exhaust manifold, defective mufflers, and inadequate sealing of fairing around strut fittings on the fuselage or cabin.

Another source of CO contamination comes from following jet aircraft on take-off, or "ground holding" prior to take-off. If possible, you should position your aircraft out of the exhaust area of preceding aircraft.

Keep in mind that in a nine-month test involving some 200 aircraft, 19 per cent had a marginal level of CO contamination. Check your own aircraft and make sure that it is CO safe.

FAA Advisory Circular 20-32 covering the dangers of carbon monoxide is available free from the FAA, Distribution Section, HQ-438, Washington, D. C. 20553.

A pilot holds one of the devices now available to measure amount of carbon monoxide so he will know whether or not he should land immediately.

By Robert J. Serling

Aviation Editor

United Press International

UPI—On a fall afternoon, a 41-year-old FAA employee named Preston J. Gauthier was on duty at FAA's flight service station, Esler Field, near Alexandria, La.

The day shift in this Government air facility, which gives flight and weather information to pilots, had just gone home. Things were quiet. Gauthier idly picked up a copy of *FAA Aviation News*.

One of the articles was on the dangers of carbon monoxide poisoning from defective aircraft cabin heaters.

"The first symptom of carbon monoxide poisoning," Gauthier read, "is a feeling of tightness across the forehead usually accompanied by a slight headache. As the poisoning becomes more severe, the headache increases and there is a throbbing in the temple. Next there may be severe headaches, general weakness, dizziness, and dimming of vision. Then there is a decided loss of muscular power, vomiting, convulsions, and coma. The pulse gradually weakens and the respiratory rate slows until there is a complete respiratory failure and death."

The magazine still was open to the carbon monoxide article when the voice of student pilot Roderic Bushnell crackled over the station's loudspeaker.

"I'm at 5,500 feet and something's wrong," he advised Gauthier. "I don't feel good. I'm dizzy and my vision's blurred."

Gauthier was well acquainted with Bushnell, a 24-year-old student pilot who was flying his own plane and en route from Alexandria to Baton Rouge.

The FAA man took another hasty look at the open magazine, then grabbed the mike.

"I think you're getting carbon monoxide," he said. "Turn off your cabin heater immediately. Open a window and descend to 2,500."

"Roger," said Bushnell.

"Head for the Marksville airport (30 miles southeast of Alexandria and about 10 miles from Bushnell's reported position) and land as soon as you can," Gauthier told the pilot.

Gauthier next phoned the state police and requested that a unit proceed immediately to the Marksville airport with an ambulance standing by.

Two minutes later, Bushnell radioed in again.

"At 2,500," he reported. "My arms are getting numb and I'm having muscle spasms in my arms and legs. And my left ear hurts bad."

"Stick to it," Gauthier said. "You should have Marksville in sight."

"Airport in sight," the pilot replied. "I think I can make it."

He landed at 5:40 p.m.—exactly 15 minutes after first reporting he was in trouble. He was rushed to a hospital where doctors confirmed he had been poisoned by carbon monoxide, but said he would recover.

At 1 a.m., Gauthier quietly finished his shift, picked up the aviation magazine and went home.

RULES OF THE ROAD

This is the eighth in a series on "Rules of the Road."

It's Who's Up Front That

Maybe you've heard it—the story about the ultimate in automated flight:

A huge airliner departs one of our major terminals and climbs toward its assigned altitude. As the passengers settle comfortably in their seats, a recorded voice is heard over the public address system.

"Welcome aboard the first fully-automated flight in airline history," says the voice over the loud speaker. "From start to finish, this flight is being controlled by a highly-complex computer system, which eliminates all need for human participation. In fact, we have no pilot or other flight crewmembers aboard. So relax and enjoy yourself. Your safety is assured. Absolutely nothing can go wrong . . . can go wrong . . . can go wrong . . ."

While somewhat fanciful, the story does illustrate the important role of the pilot in aviation. Only he can make the critical, as well as routine, decisions on which the safety of flight depends.

The *Federal Aviation Regulations* recognize this fact and Part 91 specifies that the pilot-in-command of an aircraft "is directly responsible for, and is the final authority as to, the operation of that aircraft."

As such, he may in an "emergency requiring immediate action" deviate from any of the general operating or flight rules prescribed in *FAR* Part 91 "to the extent required to meet the emergency." However, it should be noted that any pilot deviating from the rules may be required to submit a written report to FAA.

A pilot's responsibilities begin before his aircraft ever leaves the ground. Under Part 91, he is required to familiarize himself with all available information pertinent to a planned flight before taking off. For flights under IFR (instrument flight rules) or flights away from airports, this information must include weather reports and forecasts, fuel requirements, alternatives available if the planned flight cannot be completed, and any known traffic delays of which he has been advised by air traffic control.

When preparing for a flight, pilots should bear in mind that the regulations prohibit operations in aircraft that are not airworthy and that he is responsible for determining whether his aircraft is in safe flying condition. Should a mechanical or structural failure after take off render the aircraft unairworthy, the pilot must discontinue the flight.

As part of his preflight check, a pilot also should make sure that all documents required to be carried in the aircraft are aboard and in proper order. The regulations specify that an aircraft may not be flown unless it has an appropriate and current airworthiness certificate which must be displayed at the cabin or cockpit entrance where it can be seen by passengers or crew.

The aircraft registration certificate also must be carried together with papers and materials—such as the appropriate current *FAA Aircraft Flight Manual*—showing each operating limitation prescribed for that aircraft. Pilots must comply with these operating limitations.

Pilots also should be aware of the provision in Part 91 concerning the use of liquor and drugs. The rule states that no one may act as a pilot or other flight crewmember of a civil aircraft while "under the influence of intoxicating liquor" or while "using any drug that affects his faculties in any way contrary to safety." Also, except in an emergency, no pilot of a civil aircraft may allow any person "who is obviously under the influence of intoxicating liquor or drugs (except a medical patient under proper care) to be carried in that aircraft."

(It should be noted that FAA recently solicited suggestions from industry and the public on strengthening the regulations in this area. The Agency believes tighter control is required because of accumulated evidence which indicates that the use of alcohol is associated with a large number of general aviation accidents.)

Equally important is the rule covering careless and reckless operation. The regulation states that "no person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another."

Should a pilot wish to conduct daylight operations under

t Counts

If you are the pilot-in-command of an aircraft, you must realize that you are directly responsible for, and are the final authority as to, the operation of that aircraft. This responsibility begins even before your plane leaves the ground. This is true in all cases whether you are a business executive flying from city to city to show off a new product or to close a business deal (top photo) or a pilot (below) who is keeping up his proficiency by taking cross country hops and checking construction or, (bottom photo) as the head of the household, taking the family on a pleasure trip to visit friends. Only the pilot-in-command can make the critical, as well as the routine, decisions on which the safety of each and every flight depends.

VFR (visual flight rules), his aircraft must have such basic instruments as an airspeed indicator, altimeter, and magnetic direction indicator. He also must have a tachometer for each engine, oil pressure gauge for each engine using pressure systems, temperature gauge for each liquid-cooled engine, oil temperature gauge for each air-cooled engine, manifold pressure gauge for each altitude engine, fuel gauges indicating the quantity of fuel in each tank and a landing gear position indicator if the aircraft has a retractable landing gear. Seat belts for all occupants also are required as are a Very pistol and appropriate flotation gear if the aircraft is operated for hire over water and beyond power-off gliding distance from shore.

For daylight IFR operations, additional instruments and equipment are needed. Included are two-way radio communications and navigational equipment appropriate to the ground facilities to be used, gyroscopic rate-of-turn indicator, bank indicator, sensitive altimeter, clock with sweep second hand, adequate generator, gyroscopic bank and pitch indicator (artificial horizon), and gyroscopic direction indicator (directional gyro or equivalent). Two-way radio equipment is also required for VFR pilots using Government controlled towers.

For night flights, various light systems are required depending on the type of operation.

Pilots who carry sport parachutists aloft also have responsibility for the safe conduct of these operations. Part 91 states that "no pilot-in-command may allow, and no person may make, a (nonemergency) parachute jump from an aircraft except in accordance with Part 105," which contains the rules for sport parachute jumping.

Similarly the regulations specify that a pilot may not allow any object to be dropped from his aircraft in flight that creates a hazard to people or property. However, this does not prohibit the dropping of objects if reasonable precautions are taken.

Additional provisions in Part 91 cover such topics as VFR and IFR flying, airport traffic patterns, minimum altitudes and right-of-way in the air. These topics have been covered in previous "Rules of the Road" articles.—J.L.

FAMOUS FLIGHTS

A Question Mark With an Answer

By Dick Shea

This is the second of a series

It was a big news day. In Albany, N. Y., a political newcomer, Franklin D. Roosevelt, took the oath of office as governor of New York. At the Rose Bowl in Pasadena, captain-elect Riegels of the University of California achieved immortality by picking up a fumble and racing to within three yards of the goal line. There, fortunately for California, he was tackled by one of his own teammates. He had run the wrong way.

High over the same Rose Bowl that afternoon, an Army Air Corps three-engine Fokker monoplane circled leisurely while its occupants watched the game below. It, too, was to achieve fame. And business leaders throughout the country made rosy New Year's Day statements on the state of the economy. They couldn't have been more wrong; the year was 1929.

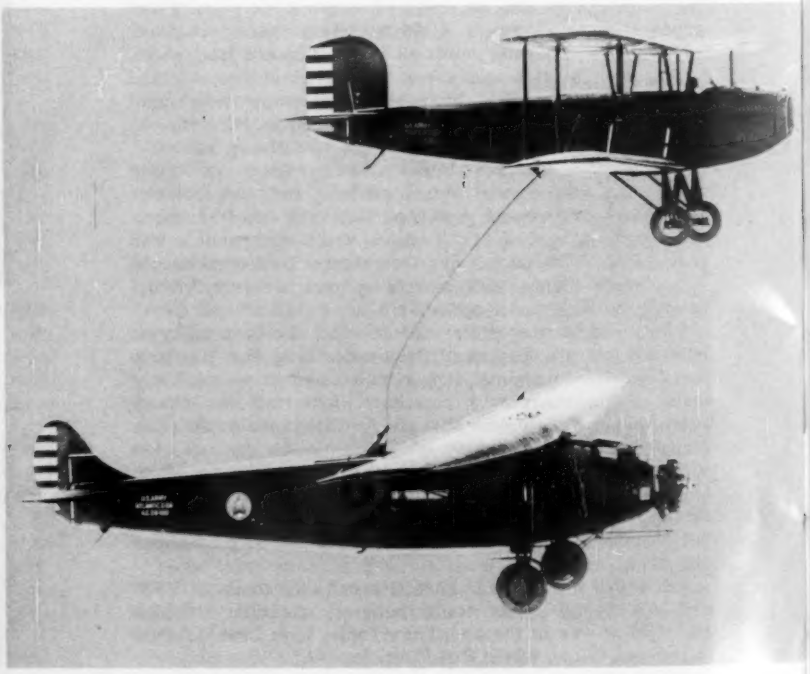
The large Fokker had taken off from Los Angeles early New Year's morning in an effort to set a new endurance record.

Its flight plan called for it to remain in the air and fly back and forth continuously between Los Angeles and San Diego, refueling aloft three times a day. Though no one could know it at the time, the plane was piloted by a star studded crew. Three of the five crew members—Maj. Carl Spaatz, Capt. Ira C. Eaker, and Lt. Elwood R. Quesada—were later to become three of the U. S. Air Force's top commanders in World War II. Still later, in 1958, Quesada would become the first FAA administrator.

Nothing untoward happened in the first few days of the flight. Excitement began to mount, however, as the plane neared the 60-hour record set in Europe the previous summer. The 60-hour mark was passed with no strain to either the plane or the crew. Major Spaatz reported in his log, which was dropped to the ground each day, that the engines were performing perfectly, and the ebullient Lieutenant Quesada wrote, "Strange as it may seem, the longer we stay up, the longer we want to. If everything keeps on, I expect we'll never want to come down."

The headline that began appearing in the newspapers across the country read, "How Long Will It Stay Up?" The airplane had been appropriately named the *Question Mark*.

Four days passed. Then five days, and



Standing in front of the *Question Mark* are, from the left, Capt. Ross G. Hoyt, pilot of the refueling plane; Capt. Ira C. Eaker; Maj. Gen. James E. Fechet, chief of the Air Corps; Maj. Carl Spaatz; Lt. Elwood R. Quesada; and M. Sgt. Roy W. Hooe, a member of the crew. Another crew member, Lt. Harry Halverson, was not present for the photograph. At right, the *Question Mark* was refueled and reprovisioned from three to five times a day.

the *Question Mark* stayed aloft. Its cruising speed averaged 71 m.p.h. while maintaining an altitude of 2,000 to 4,000 feet. The *Question Mark* veered from its Los Angeles-San Diego course only one day, when fog, clouds and down drafts socked in the coastal areas. Clear air was found over the Imperial Valley near the Mexican border and the flight continued. Meanwhile, refueling in the air and dropping supplies by basket from plane to plane went on without interruption—three, four, and sometimes five times a day.

What makes the flight incredible to the pilot of 1965 was the success of this refueling operation. It went on in daylight and at night. There was no radio in either plane—communication was by hand signals. The fuel had to be hand pumped and the fuel lines were so short that at times the refueling plane and *Question Mark* were within 10 feet of each other.

By Sunday, Jan. 6, the *Question Mark* was famous throughout the world. It had already beaten every flight endurance record, including one held by the famous *Graf Zepplin* which stayed aloft 112 hours on a transatlantic flight from Germany to the United States. The crew was invincible. Lieutenant Quesada noted in his log, "The human being is going to outlast the motors." His words were prophetic. That afternoon, the motors began to act up. Major Spaatz ordered that further flight be limited to a large circle around the Los Angeles Airport—a circle close enough to permit the aircraft to glide in for a landing.

A crowd began to assemble at the airport and by Monday it had grown to 2,000 persons. The *Question Mark* was still aloft. The crew was still optimistic. Previous engine trouble had worked itself out. About 2 p.m., however, the left engine faltered and then quit. Major Spaatz took over controls and immediately brought the plane down. It landed without incident to the applause of thousands of persons.

The *Question Mark* had astonished everybody. It had flown continuously for more than 150 hours. It had logged more than 11,000 miles. Major Spaatz summed up the flight with the comment: "We have found that mechanical conditions rather than the conditions of man is the only limiting factor in sustained flight."

Thirty-six years later, the United States was to make another test of man's endurance in flight. This test, too, was successful and at its conclusion, Lt. Col. L. Gordon Cooper and Lt. Comdr. Charles Conrad Jr. reached essentially the same conclusion as Major Spaatz.

Letters

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but initials will be withheld on request.

• Fixed-base Operation

I would like some information concerning applicable regulations and certification requirements for conducting a fixed-base operation. The operation would include aircraft rental, charter services, and associated maintenance.

D. D.
New York

Federal Aviation Regulations *Part 135, Air Taxi Operators and Commercial Operators of Small Aircraft, pertains, generally, to fixed-base operations of small aircraft with a gross take-off weight of 12,500 pounds or less. It governs the certification and operation of air taxi, charter, and commercial operators using small aircraft. Comparable provisions governing commercial operators of large aircraft (over 12,500 pounds) are found in* FAR *Part 121.* FAR *Part 43 governs the maintenance of aircraft used in these operations.* FAR *Part 91, General Operating and Flight Rules, govern the operation and maintenance of aircraft used in aircraft rental business.*

A fixed-base operator should also be familiar with FAR *Part 61, Certification: Pilots and Flight Instructors, which contains pilot certification and recency of experience requirements.*

Federal Air Regulation *Part 1 covers definitions and abbreviations.*

You can buy these publications from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402: FAR *Part 43, 20 cents; Part 21, 25 cents; Part 121, $1; and 30 cents each for* FAR *Part 61,* FAR *Part 91, and* FAR *Part 135.*

If you need further information and guidance, we suggest that you get in touch with the nearest FAA General Aviation District Office.

• Under Sixteen

Could you tell me if there is such a thing as a restricted student's pilot certificate for anyone under the age of 16? I am 15 now and would also like to know if I need a license in order to log dual instruction hours. I am studying weather, navigation, and have a book on FAA rules and would like to log some hours with an FAA flight instructor so I'll be ready to solo when I am 16.

I have read in some magazines where youngsters, ranging in age from 8 to 14 have been flying solo. Is this possible?

Eustis, Fla.

There is no restricted student pilot certificate. However, no student pilot certificate or medical certificate is required for dual instruction. You may log flight instruction you have received from a certificated flight instructor, regardless of your age. It is quite possible for you to receive all the instruction you need before you are 16 and make your first solo flight and obtain your student pilot certificate when you become eligible at 16.

We have checked several widely publicized instances of solo flights in powered aircraft by very young pilots and have found that the flights in question were made outside the United States.

• Order Blanks Anyone?

Could you send me 15 copies of your subscription notice for *FAA Aviation News?* I would like to forward a copy to the members of my flying club suggesting that each pilot subscribe.

I feel that this magazine is perhaps the best in the field of aviation that is printed today because it contains up-to-date information of FAA activities and informative, factual articles of interest to all classes of pilots.

The publication is a credit to both the FAA and the GPO and a definite asset to the aviation population.

Paul VanHoorebeke
Secretary-Treasurer
Interstate Cadets Inc.
Rock Island, Ill.

Many thanks. The subscription forms have been sent. Anyone else?

• Handling the Controls

Received bad news about my medical certificate. Needless to say, it hurts to give up as I was all "hepped up" about flying again after a 20-year lay-off, since the Air Corps days.

Would appreciate knowing what the regulations are as to handling controls of an airplane when another pilot is in command.

Reno, Nev.

If the aircraft is being operated under Federal Aviation Regulations *Part 91, and the pilot-in-command is properly certificated, the regulations do not prohibit another person from handling the controls of an aircraft during flight, whether or not he has a medical certificate.*

The pilot-in-command, of course, retains full responsibility for the operation and safety of the aircraft.

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